WHAT IS CLAIMED IS:

1. A signal processing building block for use in an adaptive signal processing system comprising:

a main input channel which receives a main input signal;

an auxiliary input channel which receives an auxiliary input signal; and

a processing mechanism that:

generates a complex adaptive weight,

applies the computed complex adaptive weight to a function of the main input signal and the auxiliary input signal to generate an output signal.

2. An adaptive signal processing system as in claim 1, wherein the processing system generates a complex adaptive weight which comprises: a sample median value of the real part of the ratio of a main input weight training data signal to an auxiliary input weight training data signal, and a sample median value of the imaginary part of the ratio of a main input weight training data signal to an auxiliary input weight training data signal.

3. An adaptive signal processing system as in claim 1, wherein the processing system generates a complex adaptive weight which comprises a sample median value of the real part of a ratio of a main input weight training data signal to an auxiliary input weight training data signal.

4. An adaptive signal processing system as claimed in claim 1,

wherein the processing mechanism generates the complex adaptive weight, w_{med}, by solving the equation:

$$w_{med} = \underset{k=1\,to\,K}{MED}\left[real\left(\frac{z(k)^*}{x(k)^*} \right) \right] + j\left\{ \underset{k=1\,to\,K}{MED}\left[imag\left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

where K is the number of weight training data samples, z is the main input signal, j is a unit imaginary number, and x is the auxiliary input signal.

5. An adaptive signal processing system as claimed in claim 4, wherein the processing mechanism generates the output signal, r, by solving the equation:

$r = z - w^*_{med}\ x.$

6. An adaptive signal processing system for receiving a plurality of input signals corresponding to a common target signal and for sequentially decorrelating the input signals to cancel the correlated noise components therefrom, the adaptive signal processing system comprising:

a plurality of building blocks arranged in a cascaded configuration for sequentially decorrelating each of the input signals from each other of the input signals to thereby yield a single filtered output signal;

wherein each building block includes:

a local main input channel which receives a local main input signal,

a local auxiliary input channel which receives a local auxiliary input signal, and

a processing mechanism that

calculates a complex adaptive weight, and

generates a local output signal, utilizing the complex adaptive weight.

7. An adaptive signal processing system as in claim 6, wherein the complex adaptive weight comprises: a sample median value of the real part of the ratio of a main input weight training data signal to an auxiliary input weight training data signal, and a sample median value of the imaginary part of the ratio of a main input weight training data signal to an auxiliary input weight training data signal..

8. An adaptive signal processing system as in claim 6, wherein each building block supplies the local output signal to a local output channel.

9. An adaptive signal processing system as claimed in claim 6,

wherein each building block generates the complex adaptive weight, w_{med}, by solving the equation:

$$w_{med} = \underset{k=1\,to\,K}{MED}\left[real\left(\frac{z(k)^*}{x(k)^*} \right) \right] + j\left\{ \underset{k=1\,to\,K}{MED}\left[imag\left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

where K is the number of weight training data samples, z is the local main input signal, j is a unit imaginary number, and x is the local auxiliary input signal; and

each building block generates the local output signal, r, by solving the equation:

$r = z - w^*_{med}\ x.$

10. An adaptive signal processing method comprising:

receiving a plurality of input signals corresponding to a common target signal;

inputting the input signals into a plurality of building blocks arranged in a cascade configuration for sequentially decorrelating each of the input signals from each other of the input signals;

generating a single filtered output signal;

wherein each building block includes a local main input channel which receives a local main input signal, a local auxiliary input channel which receives a local auxiliary input signal, and a processing mechanism that calculates a complex adaptive weight, and generates a local output signal, utilizing the complex adaptive weight.

11. An adaptive signal processing method as in claim 10, wherein each building block generates the complex adaptive weight w_{med} by calculating a sample median value of the real part of a ratio of a main input weight training data signal to an auxiliary input weight training data signal and calculating a sample median value of the imaginary part of the ratio of a main input weight training data signal to an auxiliary input weight training data signal.

12. An adaptive signal processing method as in claim 10, wherein each building block generates the complex adaptive weight w_{med} by calculating a sample median value of the real part of the ratio of a main input weight training data signal to an auxiliary input weight training data signal.

13. An adaptive signal processing method as in claim 10, wherein each building block generates the complex adaptive weight w_{med} by calculating a sample median value of the imaginary part of a ratio of a main input weight training data signal to an auxiliary input weight training data signal.

14. An adaptive signal processing method as claimed in claim 10,

wherein each building block generates the complex adaptive weight, w_{med}, by solving the equation:

$$w_{med} = \underset{k=1 to K}{MED}\left[real\left(\frac{z(k)^*}{x(k)^*} \right) \right] + j\left\{ \underset{k=1 to K}{MED}\left[imag\left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

where K is the number of weight training data samples, z is the local main input signal, j is the unit imaginary vector, and x is the local auxiliary input signal.

15. An adaptive signal processing method as claimed in claim 14, wherein each building block generates the local output signal, r, by solving the equation:

$r = z - w^*_{med} x.$

16. An adaptive signal processing system comprising:

a means for receiving a plurality of input signals corresponding to the same target signal;

a means for inputting the input signals into a plurality of building blocks arranged in a cascade configuration for sequentially decorrelating each of the input signals from each other of the input signals;